AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A temperature sensing method in which pulses of optical radiation are launched by a laser diode into an optical fibre and optical radiation backscattered from the fibre is detected, the method comprising passing the backscattered radiation through a single optical filter whereby a first signal from Raman scattering is recorded at the anti-Stokes Raman wavelength from a ~~signal~~ pulse launched by the laser diode in a laser mode and a second signal from Rayleigh scattering is recorded at the ~~Rayleigh~~ anti-Stokes Raman wavelength from a ~~signal~~ pulse launched by the laser diode in a light emitting diode mode, and a comparison is made of the two signals ~~to provide~~ , wherein said detecting is performed using a light detector to count photons passing through the single optical filter, wherein the photon count provides an indication of temperature and the arrival time of the signals allows identification of the position of that temperature along the length of the optical fibre.

2. (currently amended) The temperature sensing method according to claim 1 wherein the comparison produces the quotient of the intensity of the Raman scattering at the anti-Stokes Raman wavelength divided by the intensity of the Rayleigh scattering at the anti-Stokes Raman wavelength.

3. (canceled)

4. (canceled)

5. (currently amended) The temperature sensing method according to claim [[4]] 1 wherein the laser diode, the single optical filter and the ~~photomultiplier tube~~ light detector are coupled to the optical fibre via connectors and at least one temperature sensor is positioned downstream of the connectors to correct error signals emanating from the connectors.

6. (original) The temperature sensing method according to claim 5 wherein a thermistor or thermocouple is located down the optical fibre to provide a temperature indication and allow for the influence of connector error.

7. (currently amended) The temperature sensing method according to ~~any one of claims 3 to 6,~~ claim 1, comprising stabilising and controlling the temperature of the laser diode and ~~photomultiplier tube~~ light detector.

8. (original) The temperature sensing method according to claim 7 wherein a short reference section of the optical fibre is held at constant temperature in a temperature controlled chamber.

9. (original) The temperature sensing method according to claim 8 comprising providing two distinct controlled temperature regions and monitoring the temperatures through use of sensors in each region, and monitoring the effect of the temperature controlled region on the accumulated photon count.

10. (currently amended) The temperature sensing method as claimed in ~~any one of the preceding claims~~ claim 1 wherein the pulses of optical radiation are transmitted at a wavelength between the ultra-violet and infrared spectrum.

11. (original) The temperature sensing method as claimed in claim 10 wherein the wavelength is in the range 775-800nm.

12. (currently amended) The temperature sensing method as claimed in ~~any one of the preceding claims~~ claim 1 wherein the laser diode is selected to have transmission power of less than 1W.

13. (currently amended) A distributed temperature sensor comprising a laser diode adapted to launch pulses of optical radiation into an optical fibre arranged to be located in thermal contact with an object, and a single optical filter coupled to a light detector to detect optical radiation backscattered from the fibre, ~~the distributed temperature sensor being adapted to operate according to the method of either claim 1 or 2.~~ wherein pulses of optical radiation are launched by the laser diode into the optical fibre and optical radiation backscattered from the fibre is detected by passing the backscattered radiation through the single optical filter whereby a first signal from Raman scattering is recorded at the anti-Stokes Raman wavelength from a pulse launched by the laser diode in a laser mode and a second signal from Rayleigh scattering is recorded at the anti-Stokes Raman wavelength from a pulse launched by the laser diode in a light emitting diode mode, and a comparison is made of the two signals, wherein the light detector counts photons passing through the single optical filter, wherein the photon count provides an

indication of temperature and the arrival time of the signals allows identification of the position of that temperature along the length of the optical fibre.

14. (canceled)

15. (currently amended) The distributed temperature sensor according to claim [[14]] 13 wherein the laser diode, the single optical filter and the ~~photomultiplier tube~~ light detector are coupled to the optical fibre via connectors and at least one temperature sensor is positioned downstream of the connectors to isolate error signals emanating from the connectors.

16. (currently amended) The distributed temperature sensor according to ~~any one of claims~~ claim 13 ~~to 15~~ comprising control means to stabilise and control the temperature of the laser diode and ~~photomultiplier tube~~ light detector.

17. (original) The distributed temperature sensor according to claim 16 wherein sensors are positioned in two distinct temperature regions to monitor the temperatures to monitor the effect of the temperature calibration region on the photon count.

18. (currently amended) The distributed temperature sensor according to ~~any one of claims~~ claim 13 ~~to 17~~ wherein the laser diode has a transmission power of less than 1W.

19. (new) The distributed temperature sensor according to claim 13 wherein the light detector is a photomultiplier tube.

20. (new) A temperature sensing method in which pulses of optical radiation are launched by a laser diode into an optical fibre and optical radiation backscattered from the fibre is detected, the method comprising passing the backscattered radiation through a single optical filter whereby a first signal from Raman scattering is recorded at the Stokes Raman wavelength from a pulse launched by the laser diode in a laser mode and a second signal from Rayleigh scattering is recorded at the Stokes Raman wavelength from a pulse launched by the laser diode in a light emitting diode mode, and a comparison is made of the two signals, wherein said detecting is performed using a light detector to count photons passing through the single optical filter, wherein the photon count provides an indication of temperature and the arrival time of the signals allows identification of the position of that temperature along the length of the optical fibre.